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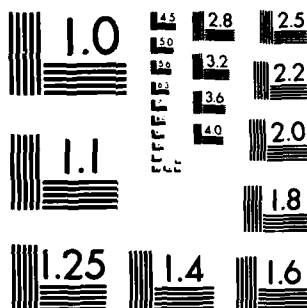
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## THESIS

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CONTROL SYSTEMS

by

James Manness Martin

December 1983

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## Control Systems

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## **ABSTRACT**

Managers are responsible for identifying the need for control and for designing control systems that are appropriate for each set of conditions. This thesis examines the nature of organizational control and discusses historical approaches to organizational control. Structural and behavioral control system theories are presented and analyzed. Four alternatives to control system design are documented and an approach to control system design is offered.

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## I. INTRODUCTION

The homeowner who installs an elaborate security system and the corporate vice president who institutes a complex budgeting procedure are each sharing a common goal: control. The homeowner is attempting to prevent unauthorized access to his property and to safeguard his assets. The system may provide for various measurement levels of sensitivity and may include a deafening alarm as instant feedback. The vice president is seeking to provide a means for translating corporate objectives to a planning and evaluation tool. The feedback may not be as instantaneous but may still be as effective. Management's attention will be quickly drawn to excessive variances and missed profit objectives.

Each individual started at the same point, recognizing the need for a control measure. From that point, however, each may have planned, designed, and constructed a control system based on entirely different theories and assumptions. Each control system may be alike in purpose but bear little resemblance in a comparison of system elements. In fact, two vice presidents (or two homeowners) facing the same control requirement may devise radically differing means of control, with each solution providing varying levels of effectiveness.

Is there a standard for developing control systems? Does the nature of the control requirement dictate a particular approach? Are financial controls based on the same underlying theories that govern behavior control? How important are the measurement and feedback functions of control? Are the situations of the homeowner and the corporate vice president really similar past the point of recognizing the need for control?

#### A. SCOPE AND OBJECTIVE

This thesis will examine the nature of control and the development of control systems. It will address the need for control and the various solutions proposed by academics and practitioners. The design of control systems for specific management objectives will be discussed and critiqued. Studies that have measured control system appropriateness and effectiveness will be presented. It will conclude with a discussion on the design of a control system and an approach for managers to consider for effective control system design.

## II. CONTROL

### A. CONCEPT

The term 'control' brings to mind many different meanings. In various contexts it may imply direction, coercion, guidance, power, or authority. Many of these words have negative connotations, as well they should in certain situations. These are not, however, the context in which control is being examined. Otley and Barry [Ref. 1] cite a second meaning, that of the regulation and monitoring of activities. This use of the word provides a glimpse of the positive nature of the control process. An example will clarify this point.

A sailboat's tiller provides a means to change the direction of the boat. The sheets to the jib sail and main sail provide one means to increase or decrease the boat's speed. At the start of a race the helmsman has an objective: to make the marks on the course and to cross the finish line first.

The selection of a sailor and a sailboat as an illustration is a deliberate attempt to oversimplify the nature of the control process and to point out the universality of the concept. The metaphor illustrates each fundamental aspect of control. The objective (or goal, plan, or mission) is to sail the boat across the finish line first. The tiller and sail sheets are two, of many, action tools that the helmsman has to cause the boat to move towards that objective. The boat's relative progress throughout the race provides both instantaneous measurement of efficiency and feedback that dictates possible corrections required. The fundamentals of

a control system are evident: objectives, actions, measurement, evaluation, and feedback.

This level of simplification is only appropriate when discussing the most mechanical of requirements and control systems. Numerical-control welding machines or computer-controlled traffic lights provide ready examples. The designs of these types of control systems are relatively straightforward. A major goal of managers is the design and application of systems to control and influence behavior. An organization's effectiveness may often depend on how well this control is exercised. It is important to remember the applicable definition of control: monitoring and regulating. The monitoring and regulating of human behavior requires a high level of control system sophistication.

## **B. MANAGEMENT'S DILEMMA**

If employees were always cognizant of the organization's objectives and could be relied on to always act in a manner that best suited these objectives, there would be no need for control measures. Unfortunately, this is not the case. Thus, one of the dilemmas facing managers is recognizing the need for control and then developing the most appropriate means to ensure control. Management's responses have varied from little or no control to highly structured environments and tightly defined job descriptions and performance standards.

How has management attempted to control the performance of the organization's employees? This section will discuss various historical approaches to the sources of control inherent in organizations.

### C. POWER

The control process implies that routines and resources are determined or influenced by members of the organization. Sociologists, and early management theorists, would first highlight the source of the control: power. Hickson and McCullough [Ref. 2] define power as "the capacity to use resources, for example wealth, status, or expert knowledge, to affect others." They examine power from the perspectives of organizational hierarchy and division of labor, acknowledging that these two concepts overlap, with hierarchy also representing a division of labor. This concept of control appeals to the autocratic manager who may yield to the most basic level of control, the ability to coerce appropriate behavior through the use of punishment and negative incentives.

A research group at the University of Aston in Birmingham, England, of which Hickson was a member, conducted what has become known as the Aston studies, a dedicated research effort of both organizations and their members [Ref. 3]. As one example of hierarchical power they contrasted the degree of centralization of formal decision making authority. Governmental and publicly owned organizations showed a high degree of centralization, reflecting the pressures of public scrutiny and accountability. In other organizations control was achieved not by the centralizing of decision-making power but by the establishment of tasks, rules, and procedures. Hickson and McCullough describe it as a "....less visible form of power, which sets the limits of what others may do, shapes the premises by which they decide, and then delegates authority within these constraints." [Ref. 4] Hickson and McCullough are careful to note that power does not flow only up and down organizations but across organizations as well. The degree of

power may favor one department over another and may vary from one organization to another. For example, the outcome of a production department-sales department battle may be decided on the perceived (or real) levels of organizational power held by each department. In fact, power also determines relationships between organizations. Pugh and Hickson [Ref. 5] cite the external dependencies (a power limitation) of organizations as correlating with greater centralization.

Cartwright [Ref. 6] summarizes the work of Tannenbaum and others which has "...underlined the importance for organizational functioning of a sufficiently high level of social influence within the organization." Using a "control graph", hierarchical levels of an organization are plotted against the amount of control (power) exercised by members at each level. The resultant curves reflect both the distribution of control throughout the organization and the total amount of control exercised. A manager who seeks to rely on power as a primary means of control requires a thorough understanding of both the control profile of the organization as well as the nuances and subtleties masked by the graph. Hickson and McCullough use this graph to contrast perceptions of hierarchical power in various organizations and to point out that power is rarely a dominion of only one level of an organization. Cartwright cites a positive correlation between the amount of total control and effective organizational performance.

Etzioni [Ref. 7] discussed power as a means for control held by various organizational positions. This power is part of the organizational control structure, a "...distribution of means used by an organization to elicit the performance it needs and to check whether the quantities and qualities of such performance are in accord with organizational specifications." [Ref. 8] Etzioni classifies these methods of control, this power, into three categories:

1. coercive power: the use, or threat of physical means
2. utilitarian power: the use of material means
3. identitive power: the use of symbols (prestige, esteem, acceptance)

All three variations of power may be utilized in one organization and tend to be aligned with structural hierarchy, i.e. coercive power is seen most often at the lower levels of an organization while utilitarian power, material rewards, is seen more often at higher levels. The consequences of the different methods of control are important to highlight: "...the application of symbolic means of control tends to convince people, that of material means tends to build up their self-oriented interests in conforming, and the use of physical means forces them to comply." [Ref. 9]

French and Raven [Ref. 10] offer another description of power. They have identified five "bases" of power, as viewed from the person subject to it:

1. reward power: conformity of behavior based on the possibility of rewards or benefits
2. coercive power: conformity of behavior based on the possibility of punishment
3. referent power: conformity of behavior based on individual attraction and identification
4. expert power: conformity of behavior based on the belief of superior knowledge or expertise
5. legitimate power: conformity of behavior due to accepted rights of influence

French and Raven would contend that all these power bases exist in any organization and that individuals will comply with them based on their perspective. The implications for all levels of the organization are clear: where are the power bases and what levels of power do they

command? Highly structured, sophisticated control systems may fall prey to the low-level, established employee who fails to participate because of an inherent distrust of "new-fangled" procedures. Other employees may view this individual as possessing high amounts of referent or expert power and then may also contribute to the failure of the organization to move towards its objectives.

Is power sufficient to control? Hickson and McCullough tie the issue back to that of decision-making. Remembering that power exists at all levels of the organization, that it exists both across the organization and between organizations, and that the balance and kinds of power are constantly shifting, the effects of power on the decision-making process (and the control system) are evident. Decisions are not made in a vacuum; organizational units are aware of other sources of power and their resulting potential for conflict. The decision-maker who ignores these conditions runs the risk of losing his source of power. The decision-maker who relies solely on one form of power as a means of control may ultimately lose that control.

#### D. ORGANIZATIONAL STRUCTURE

An organisational structure is the body of the enterprise, control is its soul. The one cannot exist without the other. [Ref. 11]

Eilon finds a clear distinction between the structure of an organization and its control function. The structure identifies major tasks of groups or departments, their hierarchical relationships, and their responsibilities. The control function "....provides solutions to problems that these groups or individuals are likely to encounter in the course of performing their tasks." [Ref. 12] These distinctions, though clear to Eilon, are not as clearly drawn by



others. Some managers view the structure of an organization as the primary means of control. An organizational chart defines relationships, charts a chain-of-command, and serves as a reference point for the members of the organization.

Salaman [Ref. 13] uses the concept of organizational structure as "...the observed, patterned continuity in the behavior and activities of organizational members over time." The continuity is the result of this structure, i.e. it serves as the control mechanism. The structure need not be spelled out by means of an organization chart or a defined policy.

Salaman highlights where Pugh and Hickson take this point one step further:

All organizations have to make provision for continuing activities directed towards the achievement of given aims. Regularities in activities such as task allocation, supervision, and coordination are developed. Such regularities constitute organization's structure, and the fact that these activities can be arranged in various ways means that organizations can have differing structures. [Ref. 14]

What, then, determines organizational structure and where does the control function enter into the decision? Are there classifications into which organizations can be placed? Do these classifications lead to appropriate control measures?

Parsons [Ref. 15] views organizations as a subset of the societal system, a system that faces four basic challenges: adaption, goal achievement, integration, and latency. He further uses these problems to develop a classification of organizational types: economic organizations, political organizations, integrative organizations, and pattern maintenance organizations. The control measures would be tied to both the type and challenges that face the organization.

Etzioni also favors the use of classification of organizations as a means of comparing their structure and control means. Building on his previously discussed classifications of power, Etzioni uses compliance as a key to this scheme. From the perspective of the organizational member, compliance refers to levels of obedience and the reasons for this behavior. Again, the power system of the organization is at the center of this classification and permits the comparisons of organizations with a broad range of goals and objectives. "Organizations that have similar compliance structures tend to have similar goals, and organizations that have similar goals tend to have similar compliance structures." [Ref. 16] Etzioni has developed three types of organizations:

1. normative organizations: a high level of goal congruence between the goals of the organization and the goals of the member
2. utilitarian organizations: the goals of the organization and the goals of the members are neutral
3. coercive organizations: there is a wide disparity between the goals of the organization and the goals of the members

Etzioni would contend that structure and control are a shared organizational characteristic and that the organizational type and control means complement each other. In fact, like power, these levels of compliance and reasons for compliance will be found throughout the organization. First-line supervisors will more likely resort to coercive means of compliance than would management at higher levels of an organization. Salaman, and others, would criticize the Parsons and Etzioni classification schemes based on their difficulty to prove empirically and their inability to narrow down the characteristic that correlates, or leads to, any given form of organizational structure.

Salaman, Ouchi [Ref. 17], Lawrence and Lorsch [Ref. 18], and San Miguel [Ref. 19] all cite the importance of the contribution of Woodward in the identification of another variable that serves as a basis for the classification of different types of organizations. Woodward [Ref. 20] identified technology as a variable for classification and eventually, structure. Woodward and her research team set out to test for correlation the abundance of management principles and business success. By sampling a vast majority of the firms in one geographical area, the research group studied a range of businesses that crossed almost every example of production technology. One conclusion Woodward reached was doubt that there exists a set of management principles applicable for all types of production systems. Another finding was that similar management practices were employed by successful organizations utilizing similar techniques of production. Technology (routine versus non-routine production) was shown to be a determinant of organizational structure and the distribution of control. Woodward provided a step in the movement towards the contingency theory of organizations: there is no ideal structure but, in her study, only an indication of the dependency of principles and structure on the technological processes of the organization.

Burns and Stalker noted varying sets of management methods in groups of industries. Their study resulted in the classification of management practices as mechanistic or organic. The mechanistic system is appropriate for organizations operating under stable conditions while the organic systems are more appropriate ".... to changing conditions, which give rise constantly to fresh problems and unforeseen requirements for action which cannot be broken down or distributed automatically arising from the functional role defined within a hierarchic structure." [Ref. 21] The

control system of the mechanistic approach requires a thorough understanding and delineation of the organization's methods and members roles. Organic methods, though, do not rely on these strict methods but, rather, exist with little formal definition and are far more adaptive to change. Lawrence and Lorsch [Ref. 22] confirmed these conclusions and found that "....effective organizational units operating in stable parts of the environment are more highly structured, while those in more dynamic parts of the environment are less formal."

Lawrence and Lorsch have made a significant contribution to organizational research with their notion of contingency theory. Concluding that "There can be no one best way to organize a business", these authors advocate a theory that views the organization as a system that adapts to its external environment by altering states of differentiation and integration among subunits. Differentiation is "....the difference in cognitive and emotional orientation among managers in different functional departments" [Ref. 23], while integration is "....the quality of the state of collaboration that exists among departments that are required to achieve unity of effort by the demands of the environment." [Ref. 24] Successful organizations utilize different structures to deal with different environments and display a high level of integration among subunits. Successful organizations, then, ensure that their control systems match their structure, i.e. are responsive to the environment in which the organization exists.

Perhaps one of the most obvious examples of the relationship of structure and control is the concept of bureaucracy. In their discussion of the bureaucratic model of decision-making, McNallen, Zand, and Lewin [Ref. 25] describe a bureaucracy as a "....large, complex, hierarchically structured organization, which has formally assigned

or delegated functions and responsibilities to subordinate or component organizations." This organizational structure parallels the mechanistic practices of Burns and Stalker and is based on the premise that efficiency results from the highly specialized division of labor and responsibility. It is obvious that this structure, to be used as the primary means of control, requires the most detailed level of understanding concerning the purpose and direction of the organization. Decision-making is reduced to following predetermined paths and procedures, while unusual circumstances require additional effort and deviations from the routine. Behavior patterns for employees are delineated through complex organizational charts and organizational procedure manuals.

What has the nature of organizational classification and structure to do with the means of organizational control? Why do the concepts seem to parallel each other so closely? Salaman provides a clue when he discusses the structural concepts of formalization (rules) and centralization (where decisions are made). Both Salaman and Child cite the fact that these variables are somewhat inversely related and both authors suggest that each characteristic may represent alternate methods of controlling behavior. As Child notes:

One may attempt to control behavior indirectly by relying upon procedures and records as methods for limiting discretion...and for monitoring activities. Within the limits imposed by such indirect controls, decisions can be delegated to lower levels in the hierarchy, and to employees in specialized roles...This can be termed the bureaucratic strategy of control. Or one may attempt to maintain control directly by confining decisions to fairly senior levels in the hierarchy. This economizes on the need for elaborate systems of procedures and paperwork...This can be termed the centralizing strategy of control. [Ref. 26]

Ouchi [Ref. 27] would take exception to this view of control being so closely linked with structure. Indeed,

citing Woodward's (and others) research on the the structure of an organization and its dependence on technology, Ouchi would insist on a distinction between structure and control. His idea of structure would include traditional vertical and horizontal characteristics while the control system would consist of two parts: a set of conditions which govern the form of control to be used and the control system itself.

Highlighting the true nature of a control system as a monitoring and evaluation system, Ouchi contends that there are only two phenomena to be monitored and compared against a standard: behavior and the outputs which result from behavior. In order to provide a means for determining the appropriateness of either behavior control or output control, Ouchi has devised a matrix based on the availability of output measures and the level of knowledge of the transformation process (resembling Woodward's concept of technology).

Various combinations of these considerations can lead managers to select either form of control or a combination of both. For example:

Since they have perfectly understood transformation processes and good measures of output, the tin can plant, the typewriter factory, and the automobile assembly plant have the option of using either form of control. Having a poorly understood transformation process but unambiguous measures of output, the life insurance agency, the advertising agency, and the research center have only the option of output control...where the transformation process is not known and outputs are unmeasurable, only ritualized control is possible. [Ref. 28]

Ouchi conducted a study of 78 retail companies to determine whether or not technologies and dimensions of organizational structure are related to either form of organizational control. Some of his conclusions include:

1. Both vertical and horizontal differentiation lead to increased completeness of output measure, while homogeneity of tasks is associated with less complete output measures.
2. The more non-routine and unanalyzable the task, the less appropriate behavior control.
3. Formalization has no significant effect on output control, suggesting that these are independent dimensions rather than substitutes.

Ouchi does not contend that structure and control are not related. He does see his view of control as having a major advantage over the structural approach because "...it easily admits the actors in the environment into consideration." [Ref. 29] The method of control must reflect the tasks that the organization is seeking to fulfill, along with a strong consideration for the appropriateness of the organizational structure. Ouchi provides an articulate challenge to managers and academics:

In the immediate sense, the problem of organization design is to discover that balance of socialization and measurement which most efficiently permits a particular organization to achieve cooperation among its members. In the longer run, the problem is to understand how, in a society that is increasingly pluralistic and thus goal-incongruent, in which interest groups become more distinct and in which a sense of community seems remote, the control of organizations can be achieved without recourse to an unthinking bureaucratization which is at odds with the increasing interdependence and ambiguity which characterize economic organizations. [Ref. 30]

### III. A STRUCTURAL APPROACH

#### A. INTRODUCTION

The development of control has moved hand-in-hand with the development of organizations. As organizations have evolved from cottage industries to multinational conglomerates the requirements of organizational design and control have also increased in complexity. Control theory has evolved as well, building upon historical theories and approaches. Ansari [Ref. 31] categorizes current approaches to control as being primarily structural or behavioral, a difference that is based on the perspective of the researchers and designers of control systems. Structural approaches reflect a concentration on information and communication while behavioral approaches emphasize human and social aspects of control. (Lebas [Ref. 32] would add a third approach, the Information Economics approach, with an emphasis on decision-making modeling. This approach will not be discussed here.) Structural approaches have been favored by cybernetic and accounting researchers while the behavioral approach reflects a sociological-psychological base. Ansari, like many others, is now using an expanded term: management control. This term emphasizes where the control is utilized and, especially for Ansari, describes those situations where "...the controlled variable is human performance." [Ref. 33]

This chapter will highlight one structural approach to management control, an approach developed by Anthony.



## B. THE ANTHONY APPROACH

### 1. Categories

Anthony [Ref. 34] has approached the control of organizations from a broader perspective by including the planning process. In comparing the control of organizations with the simple mechanistic control previously outlined, he cites some major differences between these two levels of control:

1. In an organization the goal planning (what the organization should be doing) is the result of the planning process and is so closely tied to the control function that they should be approached as one process.
2. The organization's control system seldom operates automatically. The critical action decisions that result from the control's measurement and feedback are often the result of how management perceives the feedback and interprets the measurement. When these involve human behavior, or judgements about human behavior, the control system can be far from automatic in recommended alternatives. For example, a defective traffic light timing mechanism produces effects that are clearly evident and often the temporary solution will be obvious. When dealing with employees, the course to bring about desired behavior may not be so easily decipherable.
3. Organizational control will often require inter-organizational coordination. A simplistic control system often acts autonomously with no regard for other systems. Organizational control seldom enjoys the luxury of such isolation.

4. Organizations are subject to a form of control not inherent in the system: the employee's self control. Each employee can exercise some judgement, whether called for or not, in carrying out responsibilities. Motivation can be the result of numerous personal reasons (i.e. religion, prejudices, education) but the outcome is the same: behavior influenced not by the control system but by the employee's self control.

In order to encompass these varied aspects of control, Anthony has classified planning and control activities into three categories: (1) strategic planning, (2) management control, and (3) operational control. These processes are viewed as a part of the organization's information system.

## 2. Strategic Planning

Strategic planning is the process of deciding on the objectives of the organization, on changes in these objectives, on the resources used to attain these objectives, and on the policies that are to govern the acquisition, use, and disposition of these resources.  
[Ref. 35]

Strategic planning is concerned with the organization's future, its long-range plans and policies. The operations of the organization will be guided by this planning. Where does the organization want to be in ten years? What new purposes or markets or missions does the organization wish to pursue? The strategic plan will usually reference parts of the organization rather than the whole entity. For example, diversification or vertical integration may be the key elements of a strategic plan. The plan will identify conditions or opportunities for growth or change. Strategic planning should not follow any timetable or regularity; its

strength lies in its ability to be responsive to opportunities that arise or are presented. As a part of the organization's information system, the strategic planning function relies on information that is typically generated outside the organization, rather than on information that is routinely found in its day-to-day operations. This point is made clearer when remembering the nature of the strategic planning process. The future is clouded with estimates, projections, forecasts, and personal expectations. Developing a strategic plan encompasses these less-than-factual figures and notions, and attempting to format them into organizational goals. The unique information requirement of strategic planning is evident.

The activities of strategic planning are most often conducted by the organization's top management. Ideally, their perspective is not obscured by the type of mid-level myopia that often, and appropriately, confronts the operating management of an organization. That is not to say that the strategic planner is necessarily free of bias. The planner's professional background may provide a reference point that is difficult to lose sight of. For example, the district sales manager who finds himself promoted to a corporate level marketing management position brings along a viewpoint that may very well clash with the comptroller who rose through the accounting ranks. A Naval officer who has commanded destroyers for much of his career may encounter significant personal difficulty when assigned to the Navy's long range planning group and asked to participate in decisions concerning the Navy of the twenty-first century.

The strategic planning function, then, is an iterative process that guides the future course of the organization. Its perspective is long-range and its information requirement unique. Its direction will, ideally, reflect both a creative and analytical response to the organizations environment.

### 3. Management Control

Management Control is the process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of the organization's objectives. [Ref. 36]

Anthony's definition of management control not only provides a meaning to the concept but a contrast with the nature of strategic planning as well. It is a control process used by managers. This process involves regularity, an action that is continuous. Contrasted with the strategic planning function, a function that responds to conditions and opportunities, management control responds to the organization's goals and the implementation of the organization's actions to achieve those goals. A control primarily exercised by line managers, management control is exerted over employees and other managers. Remember that coordination of control is a key aspect of organizational control.

Note the mention of effectiveness and efficiency in the definition of management control. It is at this point that measurement becomes an important part of the control process. The strategic plan of an organization may not be measurable for years to come but management control requires a measurement of not only whether or not the organization's resources are being used efficiently but whether or not they are being used to achieve the organization's goals. For example, a charity-sponsored meals program may be providing free, nutritious meals throughout the community. If, however, the recipients of the generosity are not the indigent street-dwellers but rather the less-needy members of the community, the charitable organization has scored high in efficiency but proved ineffective in meeting its goal of providing for the downtrodden.

Management control narrows its information requirement. The information is usually in the form of plans and reports of actual data. Combine this with the emphasis on resource utilization and it becomes evident that the information of management control is most appropriately expressed in financial terms and measured in monetary units. This method of information provides management with a means of comparison, evaluation, and performance measurement. For a profit oriented organization this means of evaluation provides a measure of fairness (perhaps only perceived) in comparisons of subunits contribution to the organization's goals.

Management control is an ongoing, managerial process that strives to ensure that the organization is efficiently moving towards the strategic goals of the organization. It is a control that is measurable and open to evaluation.

#### 4. Operational Control

Operational control is the process of assuring that specific tasks are carried out effectively and efficiently. [Ref. 37]

This form of control comes closer to the form of mechanistic control outlined previously. The focus is on specific, identifiable tasks and relationships where actions and results can be analyzed and optimum results known with a high degree of certainty. The tasks are usually identifiable with a factual body of science or are appropriate for mathematical modeling. This form of control does not necessarily exclude situations where the employee is an active participant. Queuing theory, and its application to the length of the line at a fast-food restaurant, has employees as a central component of any solution equation. A more appropriate example of operational control is a cash

management algorithm used by a large mail-order firm. By an accurate (mathematical) assessment of the firm's daily cash requirements, available cash is more efficiently put to use.

Operational control, then, depends upon how well each activity can be analyzed and whether or not an optimum relationship can be found. Measurement is not usually done in financial terms or units.

### C. DISCUSSION

These forms of planning and control do not exist in isolation. In fact, all three are easily imagined in typical organizations. The strategic planning function of an organization is a key to its long-term viability. Planning has long been noted as one of the key management functions but in Anthony's approach it becomes so closely aligned with the control process that it becomes a part of the process. A control system that exists in isolation from the planning function does so at the risk of controlling towards the wrong output.

Euske [Ref. 38] uses Anthony's categorization to discuss the usefulness of the budget as a management control device. His discussion is especially appropriate for public sector managers in view of Anthony's phases of a formal management control system:

1. Programming
2. Budgeting
3. Operating and Accounting
4. Reporting and Analysis

This approach to the management control process is most obvious in the Department of Defense which utilizes a Planning, Programming and Budgeting System (PPBS).

Euske points out that this concept of management control is attractive to the private sector because of the availability of the profit measure and the use of flexible budgeting. These two devices provide a means for both planning and the measurement of efficiency and effectiveness. The public sector often lacks these means and so those same forms of measurement become more difficult. In fact, government managers are often faced with the prospect of losing any budgeted funds not expended, while at the same time their performance evaluation may be based on the amount of funds and their expenditure. Euske discusses the importance of tying performance measures to the organization's goal and seeking to ensure that these are reflected in the budget. He concludes:

Therefore, if the budget is to be a useful management control tool, emphasis must be placed not only on the expenditure of funds represented by the budget but also on the specific goals of services that are generated by these expenditures. In other words, if effort or input measures predominate, careful analysis is necessary to assure that the measures do relate to desired output.  
[Ref. 39]

Ansari suggests that the structural approach to management control places too much emphasis on the variables of information and communication and not enough emphasis on social variables. As evidence he offers management control's primary use of financial terms and measurements. Although Ansari is building the background for his own view of an integrated approach to control system design, his criticism, along with Euske's discussion, points out the accounting perspective of this concept of management control and its potential limited nature.

Otley and Berry are less kind in their comments on the Anthony categorization. These authors contend that:

1. Organizational theorists have tended to study the effects of control rather than their appropriateness.
2. Control theorists have ignored the human element which renders organizations so unique from other systems.
3. Accounting researchers have ignored both bodies of thought and require an updated base upon which to design control systems.

Otley and Berry argue that the development of accounting is still languishing in outmoded organization theory despite its potential to "....serve as a control system by providing both a language and a set of procedures for establishing quantitative standards of performance and in measuring actual performance." [Ref. 40] They cite the need for accounting information to match the control procedures of organizations. Claiming that Anthony's management control attempts to bridge that gap, they find it lacking:

Despite its initial plausibility, this definition by which management control is distinguished from strategic planning and operational control raises significant problems...

1. The problem of defining organizational goals is explained away by relegating it to the realm of strategic planning.
2. The issue of ensuring that desired activities occur is left to operational control. The purpose of this simplification is to define an area of study which can ignore the great differences in organization that occur due to technology and environment, so as to be able to discover a universal system of management control.

Having done this leaves an emaciated concept of management control which may have been valuable as an initial strategy, but is a present embarrassment in implying an over-narrow view of the management control process. [Ref. 41]

Lebas notes one reason for the attractiveness of this concept of management control. The approach does not emphasize a behavior model but rather a construction of a set of



rules and procedures whose effectiveness is measured by financial terms. As he points out, "....managers do not want theories; they want solutions." [Ref. 42]

#### **IV. THE BEHAVIORAL APPROACH**

##### **A. INTRODUCTION**

The behavioral approach to management control centers on the way in which human behavior and social processes are directed to fulfilling the goals of the organization. The nature and complexity of human behavior has resulted in a diverse number of behavioral approaches to control in organizations. This section will highlight the evolutionary nature of the behavioral approach and the control theories of a number of authors.

##### **B. EVOLUTION**

Ansari [Ref. 43] divides the evolution of behavior control into three phases, (1) the traditional management phase, (2) the human relations phase, and (3) the contingency theory phase.

1. The traditional management phase reflects the early views of management, primarily the concepts of Taylor's scientific management. The essence of the control system has already been discussed: power. The managers of an organization controlled employees behavior by their control of the rewards and the organization's resources. Management's focus was in determining the optimum way to carry out tasks and then utilizing their power to obtain the employees compliance.
2. The human relations phase is characterized by the shift of thought from a view of employees as strictly economically motivated to a view of employees who

also seek psychological satisfaction. This phase recognized that employees had other needs than economic ones and that the organization could satisfy some of these needs. Maslow's well known hierarchy of needs emphasized varying levels of these individual requirements, from basic physiological needs to the need for self-actualization. The effects on management's control was a shift from trying to motivate with power to motivating by increasing worker satisfaction. Ansari calls the phase "....a change in focus of the management function from direction to leadership." [Ref. 44]

3. The essence of the contingency theory phase has been highlighted in Chapter II. Its premise is that the search for the one-best-way of organizing or controlling promises to result in disappointment. There are too many variables, too many structures, and too many conditions. The search should focus on the most appropriate solution for a given state of circumstances.

#### 1. General Systems Theory

Ansari points out that much of the contingency theory emphasis derives from general systems theory and its applications to organizations. This theory evolved from the precept that there is a level at which the principles of scientific disciplines begin, or relate to each other. The level is the "system". Miller [Ref. 45] defines a system as "....a set of interacting units with relationships among them." Each system relates to every other system, usually analogized as a hierarchy of order. Each system exists in an environment, an environment that consists of higher-order systems. Each system's actions affect, and are affected by, other systems.

Although this barely scratches the surface of general systems theory, its adaption to organizations is easily imagined. Organizations do not exist in isolation from their environment and departments within organizations do not exist in isolation from each other. System concepts of boundaries, an open or closed nature, and entropy all find analogies in organization theory. The attractiveness of general systems theory to contingency theory is that it points out the myriad involvements and interactions inherent in organizations and their employees. The proposition that any one theory or control system is appropriate for all organizations quickly loses credibility. The analysis of the organization's relationships, its technologies, its environment, and its employees will lead to a set of conditions that will provide a unique control requirement.

#### C. THE OUCHI APPROACH

Ouchi [Ref. 46] has provided a framework to guide the design of organizational control. His framework addresses the difficulty of achieving cooperation among persons with varying levels of goal congruence that are all involved in the pursuit of the organization's goals. Not only is there difficulty in guiding their effort, but a measurement of their cooperation is necessary to ensure an equitable reward system. Ouchi has described three mechanisms through which these problems can be dealt with, (1) markets, (2) bureaucracies, and (3) clans.

##### 1. Markets

The term "market" is used in an economic sense. In a pure market, decision-making is reduced to a simple utility function. Prices (or benefits) provide all the control necessary to ensure behavior that is consistent with

the organization's goals. Management's evaluation and reward responsibilities are reduced to measurement of contribution, a measurement that is also provided by the price or benefit. Ouchi provides the example of an organization's purchasing department where competitive bids establish the price and reduce the decision-making requirement to selecting the lowest bid that meets specifications.

A viable market requires a "norm of reciprocity" among its members. This basic social requirement ensures that each member of the market acts honestly or, if not, that every other member of the market will take part in the punishment, i.e. typically exclusion from the market. Without this means of reciprocity the market would require levels of supervision to ensure compliance and much of the simplicity of control would be lost. Unlike the social requirement for a market, its information requirement is much more demanding. Ouchi uses the example of a profit or investment center in an organization that is attempting control through a market mechanism:

In some large organizations, it is possible, with great effort and a huge accounting staff, to create internal numbers which will serve the functions of prices. That is, if division general managers and department heads attempt to maximize their profit by taking the best prices available within the firm, then the firm as a whole will benefit. [Ref. 47]

## 2. Bureaucracies

In a bureaucracy the nature of control does not rely on a utility function but, rather, on a set of rules, guidelines, and supervision. A perfect market provides sufficient information to make decisions but a bureaucracy requires comparison of behavior to a pre-established set of rules and guidelines, in order to measure levels of

compliance. The term "rule" implies a restriction but in actuality it can be a plan or, as Ouchi provides, a standard or budget. The necessity for rules and guidelines, made necessary by the lack of any market price mechanism, provides an indication of why bureaucracies develop significant levels of hierarchy and functional organizations. Supervisors must constantly evaluate adherence to the rules and, with each level of complexity, specialization ensues.

The increased level of supervision also adds an additional social requirement to the bureaucracy. In addition to the norm of reciprocity (i.e. a days work for a days pay, according to Ouchi) this control mechanism requires the members to recognize and accept the "legitimate authority" of the supervisors. These supervisors are often the same persons who develop the rules of the organization. These rules fulfill the information requirement of the organization and, depending on their level of thoroughness and measurability, provide effective control and guidance to the organization.

### 3. Clans

Every organization possesses an informal social structure. In some cases this social structure may provide a means of control. Typically, in these instances, not only does an effective price mechanism not exist but the nature of the individual members' contribution is difficult to structure through rules and guidelines. Ouchi provides the example of health care professionals. These professionals are characterized not only by high levels of technological skill but by their shared values, values that are likely to be congruent with the organization's goals.

When these socialization processes characterize groups such as physicians or nurses who occupy different organizations but with similar values, we refer to them as professions. When the socialization process refers to

all the citizens of a political unit, we refer to it as a culture. When it refers to the properties of a unique organization, we may refer to it as a clan. [Ref. 48]

These values play a key role in the demanding social requirement of a clan:

....it relies upon a deep level of common agreement between members on what constitutes proper behavior, and it requires a high level of commitment on the part of each individual to those socially prescribed behaviors. [Ref. 49]

#### 4. Behavior and Output Control

These mechanisms of control are in line with Ouchi's nature of a control system, outlined in Chapter II. Recall that the only two subjects of measurement, according to Ouchi, are behavior and outputs. In a pure market mechanism, output measurement is satisfied through the use of prices. In a bureaucracy, behavior is measured through both a comparison of adherence to rules and an evaluation by the superior. In a clan mechanism, neither behavior nor outputs are effective measurements and the ceremonies or rituals of the clan may serve as the control.

....suppose that we are running a research laboratory at a multibillion dollar corporation. We have no ability to define the rules of behavior which, if followed, will lead to the desired breakthroughs which will, in turn, lead to marketable new products for the company. We can measure the ultimate success of a scientific discovery, but it may take ten, twenty, or even fifty years for an apparently arcane discovery to be fully appreciated. Certainly, we would be wary of using a strong form of output control to encourage certain scientists in our lab while discouraging others. Effectively, we are unable to use either behavior or output measures, thus leaving us with no "rational" form of control. [Ref. 50]

#### D. THE USE OF BEHAVIOR CONTROLS

Cammann [Ref. 51] discussed the relationship between control systems and their results (the outcomes and behaviors they produce). Despite a body of research that indicates budgets and other financial reports are important tools for influencing subordinates, he laments the lack of research into why some control systems will produce positive results in one situation and negative results in another. Cammann sought to identify characteristics which affect these outcomes, centering his research on subordinate participation in decision making, subordinate job difficulty, and the various uses of control systems by superiors. He identified four ways in which control systems are used to influence behavior:

1. Goal setting: By using the control system to convey the goals of the organization, the superior may expect subordinates to work toward those goals.
2. Evaluation: By using the control system as a performance measurement tool, the superior may expect subordinates to strive for favorable evaluations.
3. Contingent reward allocation: By extending the evaluation use to include the allocation of rewards, the control system will motivate workers to the desired behavior.
4. Problem solving: This use of a control system highlights work-related problems and is not usually personnel directed.

In his study Cammann also chose four types of responses to control systems:

1. Effort: control systems may cause subordinates to increase their effort.



2. Job satisfaction: control systems may increase subordinate job satisfaction and motivation.
3. Tactical responses: control systems can cause subordinates to respond tactically, i.e. "gaming" the system and questioning its ability and validity.
4. Defensive orientation: Control systems can cause subordinates to alter the validity of the information and performance measurement.

Cammann used a sample of managers from a moderately large U.S. organization to test the ways in which subordinates respond to their perceived uses of control. His conclusions include:

1. Control systems can be useful tools for motivating subordinates to develop their skills and improve their performance, as long as the control system information is used as a basis for developmental problem solving, and that this use will be most effective when the subordinates have relatively easy job goals and participate in decision making.
2. The use for goal setting is valuable for motivating subordinates to perform well when the goals serve to clarify agreements which are developed through a process of mutual influence, but that it will simply motivate resistance if the goals are used to impose difficult performance standards.
3. The final pattern of use involves making organizational rewards and penalties directly contingent on control system results...this use of control system information will always result in dysfunctional responses as subordinates try to insure that their measured results are high. However, it can also produce the functional result of effort when subordinates have difficult jobs and don't participate in decision making.  
[Ref. 52]

Why is this important? Once again it highlights the significance of tailoring the control system to not only the organization's goals but to the individual's as well. A poorly directed and communicated control system can produce poor results in one situation and exceptional results in

another setting. The improper use of external control (strict, "people-proof" goals and standards, with rewards tied to performance) may result in subordinates striving just toward the behavior that is being measured or attempting to manipulate the measurement. Cammann and Nadler point out that dangers also exist for the inappropriate use of internal motivation [Ref. 53].

Merchant [Ref. 54] was concerned that much of the research conducted on the appropriate use of control systems was conducted at lower levels of analysis, primarily at the level of the individual. He sought to lift the level of the analysis to the corporate level, again using the budget as a focal point. The goal of the study was to "....relate characteristics of budgeting to variables descriptive of both the corporate context and individual and organizational outcomes." [Ref. 55] Merchant elected to examine these relationships in one industry, electronics, with nineteen organizations participating. The idea of corporate context refers to the organization's size, diversity, and degree of centralization. Merchant hypothesized that :

1. Larger, more diverse, decentralized firms tend to use an administrative control strategy that, in terms of the budgeting system and budgeting behavior is consistent with:
  - a) greater middle-and lower-management participation in budget-related activities
  - b) greater importance placed on achieving budget plans
  - c) more formal patterns of communication, and
  - d) greater budgeting system sophistication
2. The motivation and attitudes of middle managers toward budgeting are higher in firms using an administratively-oriented budgeting system.
3. Organizational performance is higher when there is a "fit" between the control strategy and the corporate context, as described in Hypothesis 1. [Ref. 56]

These hypotheses do not neglect the control requirements of smaller organizations but, rather, view the control system choice as a continuum with large, diverse, highly decentralized organizations at one end and smaller, limited organizations at the other. The administrative control system is contrasted with an interpersonal control strategy that relies on a personnel orientation, direct supervision, and oral communication. Hypothesis 3 reflects this idea of the "fit" between control strategy and the corporate context.

Merchant's findings did indeed indicate that the approach to budgeting varied with the corporate context, and that the points of hypothesis 1 were supported. The motivation and attitudes of managers toward budgeting, hypothesis 2, were higher where management participation was higher and where managers perceived that budget goals were important. Merchant finds the correlation of hypothesis 3 to be very important. The results suggest that the performance level of managers is indeed higher when there is a "fit" between the control strategy and the corporate context. The contingency theory of control strategy highlights to managers the importance of matching the use of control systems with the organization.

## **V. CONTROL SYSTEM DESIGN**

### **A. INTRODUCTION**

The requirement for the use of control systems in organizations is clear. Luthans [Ref. 57] defines control as "...the process which eliminates chaos and provides consistency in an organization in order for goals to be obtained." The recognition of the need for controls, however, is only a starting point. Effective managers must evaluate the requirement and then design the organization's control system. Some researchers have suggested systems ranging from a management accounting system to an integrated control system. This chapter will highlight a number of approaches to the design of effective control systems.

### **B. WHAT IS TO BE CONTROLLED**

Merchant [Ref. 58] believes that too much of the management literature focuses on the measurement and feedback functions of the control process. Although these functions may prove efficient in some circumstances, they may not be feasible in others. Performance assessment may be subjective and difficult. Although managers do have the opportunity to limit some of the control problem through such mechanisms as automation and centralization of decision-making, most managers must rely on the individuals in the organization to meet the organization's goals. In his categorization, Merchant parallels the work of Ouchi in his division of the types of control. He views control as consisting of three categories, according to the object of control: (1) specific actions, (2) results, and (3) personnel.

1. Specific action control requires that managers have determined the exact behavior that is necessary for task accomplishment. Through the limiting of individual choices, management assures that these behaviors are carried out. This need not be as coercive as it may seem. Managers can institute a well-defined policy of accountability for employees, a policy that may provide motivation to the employees through a reward structure.
2. The control of results places the control emphasis first on management to provide a thorough description of desired results. The primary responsibility, however, belongs to the individuals responsible for achieving those results. Employees must be aware of the results expected and view their rewards as tied to results.
3. Personnel control depends upon a high level of goal congruence between the employees and the organization. By selecting individuals who can be expected to act in the best interests of the organization, the control process is simplified. This type of control also requires effective communication of the organization's goals and the fostering of personnel development.

Although all three types of control may be available in any given situation, the determination of the control feasibility is a key issue. Merchant, like Ouchi, has constructed a matrix that compares "ability to measure results" with the "knowledge of which specific actions are desirable." In a situation where both of these variables are low, Merchant would recommend personnel control, a situation often encountered in organizations staffed by highly trained professionals. Another example would be:

....where knowledge of desirable specific actions is poor but good results measurements are available, control is best accomplished by controlling results. Movie production is a good example. It is probably impossible to dictate what a movie director should do or even to observe his or her behavior and predict whether the finished product will be good. It is, however, a relatively easy task to measure the economic performance of the movie and the artistic merit, if that is a concern. In this situation, the best control system would seem to be a results-accountability system that defines to the director the results expected, holds him or her responsible for achieving them, and provides some reinforcement in the form of compensation and/or recognition. [Ref. 59]

For Merchant, two of the key dangers in the implementation of controls are (1) the use of the wrong type of control and, (2) inadequate consideration for the cost of control.

#### C. MANAGEMENT ACCOUNTING SYSTEMS

Collins [Ref. 60] provides an assertion that an effective management control system may already exist in the form of an organization's management accounting system. Although this system exists for other analytical purposes it may also provide a means through which to communicate organizational goals. Collins uses role theory to tie these concepts together. Defining a role as "....a set of regular and enduring behaviors pertaining to a particular task or social function" [Ref. 61], Collins states that "....organizational norms specify what constitutes appropriate role behavior." [Ref. 62] The construction of these norms (i.e. control) is the responsibility of management. Although management cannot expect to control individual norms, they do influence them. Collins proposes three ways in which the management accounting system effects organizational control:

1. The managerial systems may be used to prescribe normative role behavior.

2. Managerial accounting systems have motivational aspects and may be used to motivate (demotivate) human performance in organizations.
3. The managerial accounting system can be and often is expressive of the organizational climate and thus is helpful in organizational maintenance and socialization processes. [Ref. 63]

Note the consistency in the functions of control and the use of management accounting to perform these functions. Management uses the system to communicate the goals of the organization. Actions (roles) are prescribed, and the system provides a means to measure, evaluate, and reward (feedback). As Collins notes,

For example, a budget may be used to convey to managers (the role incumbents) what role or task performance is expected of them regarding cost control. Or as another example of how the managerial accounting system may prescribe behavior: is careful and close cost control required (efficiency) or are results (effectiveness) more important?...managerial accounting systems may be, and are being, used to convey normative role expectations. [Ref. 64]

#### D. AN INFORMED CHOICE

Cammann and Nadler [Ref. 65] note the finding that organizational control systems often produce unintended consequences. They contend that the problem is often in the way in which managers use control systems. To alleviate this difficulty the authors suggest tailoring the control strategy to the organization and to the manager's style of management. Control strategies are primarily of two approaches, (1) external control and, (2) internal motivation.

1. External control reflects a results-oriented strategy where motivation is primarily achieved through rewards and supervision. The strategy requires a

form of measurement that is reliable and not subject to tampering. The measurement provides a means with which to reward or punish employees' efforts. External control may also provide motivation to maximize results at the expense of other organizational goals. This nature of control parallels the output control of Ouchi and the results control of Merchant.

2. Internal motivation is characterized by efforts resulting from a sense of accomplishment, recognition, and self-esteem. This motivation results from the goal congruence of the employees and the organization, a congruence that results from the employees' participation in the setting of goals. Measurement of accomplishment is not strictly for reward allocation but primarily to point out problem areas for the joint consideration of management and employees. Participation is the key to this control strategy.

These strategies of control closely parallel many of the approaches already discussed. Camman and Nadler, however, now propose that the choice of which strategy, or combinations of strategy, to be used should depend upon a manager's answers to four key questions:

1. In general, what kind of managerial style do I have?
2. In general, what kind of climate, structure, and reward system does my organization have?
3. How accurate and reliable are the measures of key areas of subordinate performance?
4. Do my subordinates desire to participate and respond well to opportunities to take responsibility for decision making and performance?  
[Ref. 66]



Note the emphasis on the style of the manager, the organization, and the employees. This contingency-like approach highlights the necessity for managers to consider all aspects of a control system's applicability. A highly directive manager trying to operate an open, participative, internally motivated control strategy may soon see it fail. A manager who views his or her managerial style as being participative but who then relies on a strict, external control reward strategy may quickly alienate his subordinates. Cammann and Nadler suggest a systematic evaluation, by managers, of these four questions in order to determine, by an informed choice, the most appropriate strategy of control.

## E. AN INTEGRATED APPROACH

In contrasting the structural and behavioral approach to management control, Ansari contends:

The problem with these approaches is that they emphasize a single perspective- one which ignores the existence of the other...while structuralists fail to recognize the impact of people on information structures, behavioral writers tend to ignore the effects of information of people. [Ref. 67]

Ansari, a systems proponent, suggests that what is needed is an integrated approach to control system design, an open systems concept. This approach would consider information, people, and technology in the design of control systems. Ansari's control system would include:

1. The controlled variable or objective: this variable is the goal of the system, a goal that depends on the level of control. For lower levels it may be the accomplishment of a given task or a set of required actions. As the control system is applied to higher

levels of the organization this variable becomes more difficult to define. Is profit the goal of the system? Is the development of new technologies the objective?

2. The information structure: this component was the primary concern of the structural approach. The information structure provides the network for measurement and communication. In an integrated approach, this is one component, interacting with the others.
3. Leadership Style: ignored by the structural approach, an integrated approach allows the consideration of psychological variables to the control equation.
4. Subordinate personality: in combination with the leadership style, the subordinates personality makes up the social side of the control system.
5. Rewards: both extrinsic and intrinsic rewards affect subordinate performance.

Ansari emphasizes the interrelationships and overlay of the control system components and stresses that effective integration is necessary for control.

An effective combination of the components...is one in which they are supportive of each other. In other words, there is a good match between them. The operational definition of a good match suggested here is the minimization of perceptual differences between managers and subordinates. That is, a designer should choose those system elements which lower the possibility of cognitive conflict between the two. [Ref. 68]

## VI. CONCLUSION

### A. REVIEW

The introductory metaphor of the homeowner's security system and the corporate vice-president's budgeting system may now be examined in a different light. The nature of the control process is the same for each individual. For each system there is a stated goal, an action, a means of measurement, evaluation, and feedback. The homeowner's control system is similar to the concepts of the closed-loop cybernetic approach, but that is a design consideration and not a departure from the nature of control. The vice-president's budgeting system resembles Anthony's structural approach, with its emphasis on rules, procedures, and the establishment of responsibility centers. Again, however, the control process reflects a universal concept and the budget is only an application of this concept to the organization. The fact that the budget is expressed in financial terms does not alter the control process. The budget is a tool to effect control, not the control system.

The measurement and feedback functions of control have been shown to be a major consideration in the determination of the type of control to be applied. Reliable measures are necessary for comparison and evaluation, especially when the generation of output is the performance measure. The control process would falter without a means to retrieve this measurement. However, the absence of a clear measurement does not preclude control. The manager who has no output to evaluate can use surrogate measurements or personnel selection procedures to exercise control.

## B. MANAGEMENT'S CHALLENGE

Few managers would classify themselves as structuralists or behaviorists in their approach to control systems. Few modern-day executives rely strictly on the forms of power to achieve their goals. Academic approaches to control provide broad backgrounds and reference points for understanding the importance of control in the managerial function. They cannot stand in isolation but must be assimilated into the manager's set of tools which are brought to bear in guiding and directing organizations. Management's challenge, then, is to accurately identify the most appropriate way to control the organization. Just as no two organizations are exactly alike, no two control systems will be exactly alike. There is no formula that will provide the most effective control system for a given organization. There are, however, effective approaches to the consideration of alternatives. A manager should consider:

1. In what environment will the control system exist? The environment includes not only the organizational culture but the participants in the organization as well.
2. What is the purpose of the control system? A control system should be designed to foster prescribed results, whether they be behavioral or outputs.
3. What are the constraints of a control system? A department-level control system may be required to conform to an existing divisional system. The cost of a control system may be prohibitive.
4. Will the control system be used as an evaluation and performance measurement tool? A poorly defined measurement base may generate goal maximization to the neglect of other important, non-measurable organizational goals.

5. Will the control system be the basis for reward allocation? Individuals must perceive the system and the allocation as fair.
6. Will the control system information accurately reflect the required data and measurement reliability? A poor information set will quickly render the system useless.
7. How will the control system purpose be communicated to the organization's members? The success of the system depends upon this key function. An accurate portrayal and communication of the control system purpose and mechanisms is essential to employee support and motivation.
8. How will the control system be evaluated and updated? There is a continuing need to ensure that the control system matches the organization and its goals.

As long as there are organizations staffed by people there will be a requirement to monitor and regulate actions towards the organization's goals. Control should not be viewed narrowly as a policing action. In addition to the guiding nature of control it may also provide the information for new opportunity and growth. This control is not beyond the reach of effective managers. The organization's goals and the goals of individual members need not be considered at odds with each other. In fact, effective managers will find a way to foster their congruence.

# LIST OF REFERENCES

1. Otley, D.T. and A. J. Berry, "Control, Organisation, and Accounting", Accounting, Organizations and Society, Vol. 5, No. 2, 1980, pp. 231-244.
2. Hickson, D. J. and A. F. McCullough, "Power in Organizations", Control and Ideology in Organizations, eds. G. Salaman and K. Thompson, Cambridge, MA: The MIT Press, 1980, p. 28.
3. Pugh, D. S., and D. J. Hickson, Organizational Structure in its Context: The Aston Programme I, Westmead, England: Saxon House, 1976, p. 51.
4. Hickson and McCullough, op. cit., p. 32
5. Pugh and Hickson, op. cit., pp. 96-102
6. Cartwright, D., "Influence, Leadership, Control", Handbook of Organizations, ed. J. G. March, Chicago, IL: Rand McNally, 1965, p. 3.
7. Etzioni, A., "Organizational Control Structure", Handbook of Organizations, ed. J. G. March, Chicago, IL: Rand McNally, 1965, pp. 650-677.
8. *ibid.*, p. 650
9. *ibid.*, p. 651
10. French, J. R. P. and B. Raven, "The Bases of Social Power", Studies in Social Power, ed. D. Cartwright, Ann Arbor, MI: University of Michigan, Institute for Social Research, 1959, pp. 150-167.
11. Eilon, S., Management Control, London: Pergamon Press, 1979, p. 10.
12. *ibid.*, p. 10
13. Salaman, G., "Classification of Organizations and Organization Structure: The Main Elements and Interrelationships", Control and Ideology in Organizations, eds. G. Salaman and K. Thompson, Cambridge, MA: The MIT Press, 1980, p. 56.
14. *ibid.*, p. 58

# LIST OF REFERENCES

1. Otley, D.T. and A. J. Berry, "Control, Organisation, and Accounting", Accounting, Organizations and Society, Vol. 5, No. 2, 1980, pp. 231-244.
2. Hickson, D. J. and A. F. McCullough, "Power in Organizations", Control and Ideology in Organizations, eds. G. Salaman and K. Thompson, Cambridge, MA: The MIT Press, 1980, p. 28.
3. Pugh, D. S., and D. J. Hickson, Organizational Structure in its Context: The Aston Programme 1, Westmead, England: Saxon House, 1976, p. 51.
4. Hickson and McCullough, op. cit., p. 32
5. Pugh and Hickson, op. cit., pp. 96-102
6. Cartwright, D., "Influence, Leadership, Control", Handbook of Organizations, ed. J. G. March, Chicago, IL: Rand McNally, 1965, p. 3.
7. Etzioni, A., "Organizational Control Structure", Handbook of Organizations, ed. J. G. March, Chicago, IL: Rand McNally, 1965, pp. 650-677.
8. ibid., p. 650
9. ibid., p. 651
10. French, J. R. P. and B. Raven, "The Bases of Social Power", Studies in Social Power, ed. D. Cartwright, Ann Arbor, MI: University of Michigan, Institute for Social Research, 1959, pp. 150-167.
11. Eilon, S., Management Control, London: Pergamon Press, 1979, p. 10.
12. ibid., p. 10
13. Salaman, G., "Classification of Organizations and Organization Structure: The Main Elements and Interrelationships", Control and Ideology in Organizations, eds. G. Salaman and K. Thompson, Cambridge, MA: The MIT Press, 1980, p. 56.
14. ibid., p. 58

15. Parsons, T., "Social Systems", The Sociology of Organizations, eds. O. Grusky and G. A. Miller, New York: The Free Press, 1970, pp. 75-82.
16. Etzioni, A., A Comparative Analysis of Complex Organizations, New York: The Free Press, 1961, p. 71.
17. Ouchi, W. G., "The Relationship Between Organizational Structure and Organizational Control", Administrative Science Quarterly, Vol. 22, No. 1, 1979, pp. 95-113.
18. Lawrence, P. R. and J. N. Lorsch, Organization and Environment: Managing Differentiation and Integration, Boston, MA: Harvard University, Graduate School of Business Administration, 1967, pp. 189-191.
19. San Miguel, J. G., "The Behavioral Sciences and Concepts and Standards for Management Planning and Control", Accounting, Organizations and Society, Vol. 2, No. 2, 1977, pp. 177-189.
20. Woodward, J., "Technology and Organization", The Sociology of Organizations, eds. O. Grusky and G. A. Miller, New York: The Free Press, 1970, pp. 273-290.
21. Burns, T., and G. M. Stalker, The Management of Innovation, London: Tavistock, 1961, p. 121.
22. Lawrence and Lorsch, op. cit., p. 189
23. Lawrence and Lorsch, op. cit., p. 11
24. Lawrence and Lorsch, op. cit., p. 12
25. McNallen, J. B., D. E. Zand, and A. Y. Lewin, "The Bureaucratic Model of the Budget Process", Armed Forces Comptroller, Vol. 18, No. 3, 1973, p. 37.
26. Child, J., "Strategies of Control and Organizational Behavior", Management Control and Decision Systems, eds. A. Patz and A. Rowe, Santa Barbara, CA: John Wiley & Sons, 1977, p. 37.
27. Ouchi, op. cit., p. 96
28. Ouchi, op. cit., p. 98
29. Ouchi, op. cit., p. 111
30. Ouchi, W. G., "A Conceptual Framework for the Design of Organizational Control Mechanisms", Management Science, Vol. 25, No. 2, 1979, p. 846.



31. Ansari, S. L., "An Integrated Approach to Control System Design", Accounting, Organizations and Society, Vol. 2, No. 2, 1977, pp. 101-112.
32. Lebas, M., "Toward a Theory of Management Control: Organizational, Information Economics, and Behavioral Approaches", an unpublished working paper, 1980, p. 8.
33. Ansari, op. cit., p. 102
34. Anthony, R. N., and J. Dearden, Management Control Systems, Richard D. Irwin, Inc., Homewood, IL: 1976, pp. 3-21. Boston, 1965.
35. Anthony, R. N., Planning and Control Systems: A Framework for Analysis, Harvard University, Graduate School of Business Administration, Boston, MA, 1965, p. 16.
36. ibid., p. 17
37. ibid., p. 18
38. Euske, K. J., "Budgeting and Public Management", Public Budgeting and Financial Management, eds. J. Rabin and T. D. Lynch, New York: Marcel Dekker, Inc., 1983, pp. 401-415.
39. ibid., pp. 413-414
40. Otley and Berry, op. cit., p. 234
41. Otley and Berry, op. cit., p. 235
42. Lebas, op. cit., p. 7
43. Ansari, op. cit., pp. 102-105.
44. Ansari, op. cit., p. 104
45. Miller, J. G., "The Nature of Living Systems", Behavioral Science, Vol. 16, 1971, p. 281.
46. Ouchi, op. cit., p. 833
47. Ouchi, op. cit., p. 839
48. Ouchi, op. cit., p. 837
49. Ouchi, op. cit., p. 838

50. Ouchi, op. cit., p. 844
51. Cammann, C., "Effects of the Use of Control Systems", Accounting, Organizations and Society, Vol. 1, No. 4, 1976, pp. 307-313.
52. ibid., p. 311
53. Cammann, C. and D. A. Nadler, "Fit Your Control Systems to Your Managerial Style", Harvard Business Review, Vol. 54, No. 1, 1976, pp. 65-72.
54. Merchant, K. A., "The Design of the Corporate Budgeting System: Influences on Managerial Behavior and Performance", The Accounting Review, Vol. LVI, No. 4, 1981, pp. 813-829.
55. ibid., p. 825
56. ibid., pp. 816-817
57. Luthans, F., Introduction to Management: A Contingency Approach, New York: McGraw Hill Book Company, 1976, p. 143.
58. Merchant, K. A., "The Control Function of Management", Sloan Management Review, Vol. 23, No. 4, 1982, pp. 43-55.
59. ibid., p. 47
60. Collins, P., "Managerial Accounting Systems and Organizational Control: A Role perspective", Accounting, Organizations and Society, Vol. 7, No. 2, 1982, pp. 107-122.
61. ibid., p. 109
62. ibid., p. 110
63. ibid., pp. 111-114
64. ibid., p. 109
65. Cammann and Nadler, op. cit., p. 65
66. Cammann and Nadler, op. cit., p. 70
67. Ansari, op. cit., p. 105
68. Ansari, op. cit., p. 109

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